

Abstract of the Disclosure

ELECTRONIC UNIT INJECTOR WITH PRESSURE ASSISTED NEEDLE
CONTROL

An electronically controlled fuel injector includes a reduced part count and complexity over similar fuel injectors without a substantial reduction in performance capabilities. This is accomplished by using a one-piece needle that is hydraulically balanced and biased toward a closed position with a spring positioned in the needle control chamber. Although subtle, this injector has some ability to control the fuel pressure when the needle valve is opening and closing by adjusting a relative timing of a pressure control valve opening relative to a needle control chamber, using separate electrical actuators. The invention is particularly applicable to fuel injectors that cycle through high and low pressure states during and between injection events, respectively. Cam actuated fuel injectors being particularly well suited.